
Space Weather Forecast

Issued on Sunday, 11 February 2024 at 01:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Current Minor Solar Radiation Storm likely declining. Further Minor/Moderate Radio Blackouts Likely. Chance of G1/G2 conditions days 2 and 3 (12-13 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High over the past 24 hours, with a high-level Moderate-class flare observed at 10/2307UTC, originating from the large and magnetically complex sunspot region located in the southwest quadrant, near centre-disc. This has the potential to produce an Earth-directed coronal mass ejection (CME), though currently awaiting imagery for analysis. There are currently eight regions on the visible disc. The aforementioned large sunspot in the southwest near centre-disc is the most magnetically complex, which contains at least three 'delta' spots. There continues to be slight growth in the penumbra of the largest spot, especially on its northern periphery. All other spots are relatively simple and unremarkable. One potentially Earth-directed CME was observed in the past 24 hours from within the vicinity of the large sunspot region located in the southwest, near centre-disc. This was associated with a high-level Common-class flare and a filament eruption, which produced a CME at around 10/0700 UTC. This has been analysed and is considered to be Earth-directed, arriving late on day 2 (12 Feb) or early on day 3 (13 Feb). No other Earth-directed CMEs have been observed, pending any potential Earth-directed CME from the recent high-level Moderate-class flare from the large sunspot mentioned above.

Solar Wind / Geomagnetic Activity: Solar winds started the period at slightly elevated levels, near 450km/s, possibly due to a weak CME arrival, before a steady decline back to slow-ambient levels. The magnetic field has been generally weak throughout. The north-south component varied weakly, with a brief southward orientation between 10/0800 UTC and 10/1200 UTC, possibly due to a weak transient feature. Geomagnetic activity has been Quiet (Kp0-2) throughout.

Energetic Particles / Solar Radiation: Solar radiation levels remains above S1 Minor Storm levels (10pfu) and shows a steady declining trend.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate X-ray flare activity likely, and a slight chance of further Strong-class activity a slight chance, with the very large region near centre-disc providing the vast majority of the risk as the active region responsible for the strong flare on the 09 Feb continues to rotate further onto the far side of the disc.

Solar Wind / Geomagnetic Activity: There are up to three CMEs which currently feature in the forecast. The first is a CME from 08 Feb arriving on day 2 (12 Feb). The second is associated with the potential shock effects from the strong flare, perhaps arriving on either day 1 (11 Feb) or day 2 (12 Feb) though this aspect is low confidence. Finally there was an eruption near south-

centre disc on 10 Feb, with possible arrival any time from late on day 3 (12 Feb) or into day 4 (13 Feb). No coronal hole fast wind enhancements are expected.

Geomagnetic activity should be mostly Quiet on day 1 (11 Feb). The shock from the Strong flare brings a slight chance of G1 conditions on day 1 (11 Feb), although this is considered low confidence, with this becoming a chance of G1/G2 on day 2 (12 Feb) into day 3 (13 Feb) with an outside slight chance of a G3 should all three possible CMEs arrive in quick succession. Lingering CME effects are possible by day 3 (13 Feb), though overall geomagnetic activity should fall back to Quiet to Unsettled by day 4 (14 Feb) with a chance of Active.

Energetic Particles / Solar Radiation: Solar radiation levels currently at S1 Minor Solar Radiation Storm levels following earlier enhancement from the Strong flare on 09 Feb. Solar radiation levels should begin to subside through the period, though likely remaining above S1 through day 1 (11 Feb), with a gradual fall to below S1 levels possibly by day 2 (12 Feb).

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	10	50	40	10
Strong	G3	No	1	5	2	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	Yes	99	80	40	30
Very Active	≥ S3 *	No	10	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						